Using a 0.014″ Doppler guide wire (FloWire™, Cardiometrics) we measured the coronary flow velocity in 6 patients undergoing an elective PTCA (1 ♀, 5 ♂, degree of stenosis 86 ± 5%). We used APC (Flowtrack™, ACS) with balloon size of 3.0 and 3.5 mm. The coronary diameter at the location of the flow measurements was obtained by quantitative angiography in 2 planes. The coronary blood flow (CBF) was calculated by the luminal area multiplied by the average peak flow velocity divided by 2.

CBF	Before PTCA	During PTCA	Student t-test
(ml/min)36.6 ± 14.78	18.9 ± 5.91	p = 0.012	

Using the APC we measured a CBF during angioplasty of 40–73% (mean 54%) of the distal perfusion before PTCA. In high risk pts being dependent on sufficient coronary perfusion APC are not able to provide adequate distal coronary blood flow during PTCA. In these patients active support devices are recommended.

905-24 Improvement of Dobutamine-Induced Wall Motion Abnormalities in Patients with Chronic Total Occluded Coronary Arteries After Recanalisation with Laser Guidewire

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Aim of the Study: To assess the reversibility of dobutamine-induced wall motion abnormalities before and after successful recanalisation by Laser Guidewire (LG) of chronic total occluded coronary arteries (TOC).

Methods: Dobutamine-atropine stress echocardiography (DASE) was performed in 17 patients (mean age 58, 12 men, 10 with prior myocardial infarction) with TOC 1 day before and within 2 days after successful LG.

Wall motion score index (WMSI) was calculated according to a 16 (extent) × 5 (severity) points echocardiographic model. DASE was considered positive for ischemia in case of new or worsening wall motion abnormalities.

Results: Resting WMSI improved from 1.31 before LG to 1.27 after LG ($p < 0.05$). Of 12 segments with improved resting wall motion abnormalities after LG, 8 were collaterals-receiving and 4 collaterals-supplying. Angina was present in 13 patients before LG and 2 patients after LG ($p < 0.0001$). Positive DASE was present in 14 patients before LG and 2 patients after LG ($p < 0.0001$). The number of ischemic segments decreased from 47 to 2 ($p < 0.0001$). Peak stress WMSI improved from 1.36 before LG to 1.18 after LG ($p < 0.005$). Peak stress–rest WMSI improved from +0.06 (worsened at peak) to −0.09 (improved at peak) ($p < 0.05$).

Conclusions: Successful LG of TOC results in a decrease in angina, resting wall motion abnormalities and stress-induced wall motion abnormalities as assessed by DASE.

906 Intravascular Ultrasound and Doppler Flow Studies in Coronary Disease

Sunday, March 16, 1997, 5:00 p.m.–7:00 p.m.
Anaheim Convention Center, Hall E
Presentation Hour: 5:00 p.m.–7:00 p.m.

906-38 Different Response of Coronary Flow Reserve to Acute Cigarette Smoking According to the High or Low Cigarette Nicotine Content

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Cigarette smoking is a major risk factor for coronary artery disease. However, its acute effect on coronary blood flow and coronary flow reserve (CFR) has not been precisely elucidated. To study an acute effect of smoking on CFR, we measured coronary flow velocity directly with Doppler flow wire in 21 smokers who underwent coronary angiography. All patients did not have significant coronary stenosis in left anterior descending artery where the probe was positioned. Eight smokers (8 males; mean age, 55 ± 13 ys) smoked a cigarette containing more than 1 mg nicotine (G1), 6 smokers (6 males; mean age, 56 ± 11 ys) smoked a cigarette containing less than 1 mg nicotine (G2) during the study, and 7 smokers (6 males and 1 female; mean age, 54 ± 8 ys) served as control subjects (C). CFR was determined twice by an each injection of intra-coronary papaverin (10 mg) before and 5 minutes after the smoking. In G1, CFR was significantly reduced even 5 minutes after the smoking (3.6 ± 2 vs 2.8 ± 11, $p < 0.01$), and serum norepinephrine (NE) and endotherin (ET) levels significantly increased after the smoking (NE; 241 ± 98 vs 275 ± 104 pg/ml, $p < 0.01$, ET; 3.3 ± 1 vs 3.9 ± 1 pg/ml, $p < 0.01$, respectively). In G2, CFR did not change during the study, although both NE and ET increased after the smoking (NE; 258 ± 228 vs 316 ± 281 pg/ml, $p < 0.05$, ET; 2.3 ± 0.3 vs 2.9 ± 0.1, $p < 0.05$, respectively). The serum nicotine levels showed slight but not significant increases during first 5 minutes after smoking both in G1 and G2. In control subjects, neither CFR, NE nor ET changed at all during the study. In conclusion, smoking a cigarette with high nicotine content induced abrupt reduction of CFR. This reduction might be mediated by other factors than the increased serum levels of NE, ET (serum vasoconstrictor) or nicotine during smoking. From a clinical standpoint of view, smoking a cigarette with high nicotine content may lower the ischemic threshold by reducing coronary vasodilatory capacity in patients with coronary artery disease.

906-39 The Reduction in In-Stent Intimal Hyperplasia Can Be Used to Predict the Improvement in Follow-Up Angiographic Diameter Stenosis: A *Volumetric* Intravascular Ultrasound Analysis

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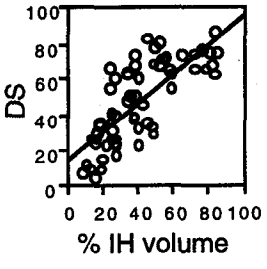
Serial intravascular ultrasound (IVUS) studies have shown (1) that in-stent restenosis is solely the result of neointimal tissue (IH) accumulation which tends to be uniformly distributed over the axial length of Palmaz-Schatz stents and that (2) the IVUS measurement of IH volume may be the most sensitive marker of strategies to reduce in-stent restenosis. However, the impact of an anticipated decrease in IH volume on the angiographic diameter stenosis (DS), the conventional measure of restenosis, is unknown. Therefore, in 72 stented lesions studied at follow-up (@5.6 mos), we compared quantitative angiography (measurement of DS) to volumetric IVUS {automated transducer pullback @0.5 mm/s; measurement of stent & lumen areas at 1 mm axial increments; calculation of stent, lumen, IH volumes (mm^3), and % IH (IH/stent) volumes using Simpson's rule}.



Stent volume	134 ± 38mm^3
Lumen volume	73 ± 45mm^3
IH volume	61 ± 38mm^3
% IH volume	32 ± 14%
DS	47 ± 23%

DS = 0.8 * % IH volume + 14 ($r = 0.757$, $p < 0.0001$)

We conclude: There is a linear relationship between the follow-up DS and neointimal tissue accumulation within Palmaz-Schatz stents. This can be used to predict the effect (on follow-up DS) of anti-restenosis strategies designed to reduce in-stent neointimal tissue growth.

906-40 Can Coronary Flow Reserve Predict the Presence of Viable Myocardium After Myocardial Infarction?

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To determine whether coronary flow reserve (CFR) can predict the presence of viable myocardium after myocardial infarction, 37 patients underwent dobutamine stress echocardiography (DSE) and intracoronary Doppler ultrasound (Flowire®) study. Improvement of wall motion occurred during the low-dose dobutamine infusion (5 to 10 μg/kg/min) was defined as the marker of viable myocardium. Coronary flow velocity in infarct-related coronary artery was measured at the distal site to the lesion at baseline and during adenosine triphosphate (ATP) infusion (0.15 mg/kg/min). CFR was calculated as the ratio of averaged peak velocity during ATP infusion to baseline. *Results:* In 26 of the 37 patients, viable myocardium in infarcted area was detected by DSE. CFR was significantly greater in 26 patients with viable myocardium than that in 11 patients without viable myocardium (2.5 ± 0.9 vs 1.6 ± 0.2, respectively, $p < 0.001$). Cut off value of 1.8 brought the best concordance between CFR measurement and DSE. CFR ≥ 1.8 could predict the presence of viable myocardium with sensitivity of 85% and specificity of 73%, respectively. *Conclusion:* CFR ≥ 1.8 in infarct-related artery is a strong predictor of the presence of viable myocardium in infarted area.